IOWA DEPARTMENT OF PUBLIC HEALTH FLUORIDE VARNISH PROTOCOL

Fluoride Varnish Facts

Background

Fluoride varnishes have been used in Europe for more than 30 years, and have recently been approved for use in the United States. They received approval in the United States as cavity varnishes and desensitizing agents, however one of the most promising uses for fluoride varnishes is in the prevention of tooth decay. The use of fluoride varnish by dentists for this purpose is referred to as "off-label" use. ¹

Fluoride Content and Uptake into Enamel

There are 3-4 fluoride varnishes available for use in the United States. Cavity Shield, Duraflor and Duraphat are brands commonly used. All contain 5% NaF. The varnishes contain 2.26% by weight fluoride ion in a colophony base. This forms a sticky layer on the tooth following application, which hardens on contact with saliva. Fluoride is then absorbed into the enamel of the tooth. It is recommended that the varnish be allowed to remain on the teeth for up to four hours for optimal absorption. ² A study by Koch and Petersson measured the levels of fluoride in extracted teeth following application of Duraflor, and found concentrations between 2,250 and 3,800 ppm in the enamel. It was also determined that increasing the time the varnish remained on the teeth from one to six hours more than doubled the fluoride level in the enamel.³

Caries Prevention

Most studies have shown 25-45% reductions in the decay rate with the use of fluoride varnish. Of special note is the reduction of decay in pits and fissures, as well as on smooth surfaces of teeth. A two-year study by Holm using 225 3-year-olds resulted in a 44% caries reduction rate following semi-annual varnish applications.⁴

Safety

The concentration of fluoride in varnishes is much higher than that of APF gels or other topical fluorides, however, due to the sticky form of the varnish and the small amount used per application, risk of ingestion and toxicity is very low. Less than 0.5 ml of varnish is usually required to coat the teeth of a young child.⁵

¹ Use of approved drugs for unlabeled indications. FDA Drug Bulletin, April, 1982.

² Retief DH, Sorvas PG, Bradley EL, Taylor RE, Walker AR. In vitro fluoride uptake, distribution and retention by human enamel after 1- and 24- hour application of various topical fluoride agents. J Dent Res 59(3):573-82, 1980.

³ Koch G, Petersson LG. Fluoride content of enamel surface treated with a varnish containing sodium fluoride. Odont Revy 23:437-46, 1972.

⁴ Holm GB, Holst K, Mejare I: The caries-preventive effect of a fluoride varnish in the fissures of the first permanent molar. Acta Odont Scand 42(4):193-7, 1984.

⁵ Ekstrand J, Koch G, Petersson LG: Plasma fluoride concentration and urinary fluoride excretion in children following application of the fluoride containing varnish Duraphat. Caries Res 14:185-9, 1980.

Application of Fluoride Varnish

- 1. Criteria for the use of fluoride varnish include the presence of factors that put a person at risk for caries, including carious lesions, white-spot lesions, and a history of decay. An additional risk factor for young children is the presence of visible plaque on the primary incisors. Socio-economic status (especially income) can also be an indicator of risk, as low-income children and adults tend to experience more caries than higher-income children and adults.
- 2. Clean the teeth. The teeth need to be "toothbrush clean" before fluoride varnish is applied. Application after a dental prophylaxis is also acceptable.
- 3. Have the varnish ready. Use one small drop of varnish (.3 ml is enough for a child and .4 ml is enough for an adult), dispensing it on a tray cover or in a small cup. Some fluoride varnishes are now packaged with the pre-measured varnish in a well.
- 4. Isolate and dry the quadrant to be treated. This can be accomplished with gauze or air. Drying should be thorough, but not excessive.
- Apply the varnish with any convenient applicator to all exposed surfaces of the teeth, including the chewing and interproximal surfaces. Disposable brushes are very effective, or cotton-tipped applicators can be used.
- 6. Repeat for all remaining quadrants.
- 7. Ask the patient not to brush their teeth for four hours following the application. Adult patients and parents of children should be informed that the patient's teeth will look yellow until the varnish is brushed off. Manufacturers of fluoride varnish recommend a patient wait 30 minutes after application before eating or drinking.
- 8. Fluoride varnish should be applied at least twice a year. Applications 3 times a year or 3 times during a 1-week period are also effective.

Personnel Required for Fluoride Varnish Application

Fluoride varnish may only be applied by a licensed dentist, licensed dental hygienist, licensed physician, registered nurse, or other health professional functioning within their scope of practice or licensure as provided under Iowa Administrative Code.